ITW CASE 14456

INSULATION PLATE FOR RETAINING ROOF DECKING MEMBRANES AND FOR REMOVING THE ADHESIVE RELEASE FILM OR RELEASE SHEET

FIELD OF THE INVENTION

The present invention relates generally to insulation plates which are adapted to be secured at predetermined locations upon an underlying roof decking substructure or system so as to assuredly retain roof decking environmental membranes and insulation members upon the underlying roof decking system or substructure, and more particularly to a new and improved insulation plate, and a roof decking system employing the same, wherein, in addition to having means structurally incorporated therein for providing enhanced engagement and gripping forces in connection with the roof decking environmental membranes overlying the underlying roof decking substructure or system, the means structurally incorporated within the new and improved insulation plate also serves to readily facilitate the removal of the release sheet from the upper surface portion of a first lower environmental membrane of a fully-adhered environmental membrane system employed in connection with the underlying roof decking substructure or system such that a second upper environmental membrane can be subsequently secured atop the first lower environmental membrane so as to complete the formation of the fully-adhered environmental membrane system, whereby

the environmental membranes can assuredly protect the underlying roof decking substructure or system despite the subjection of the various roof decking components to wind or other environmental forces.

BACKGROUND OF THE INVENTION

Various types of plates are conventionally used in connection with the securing of environmental membranes upon underlying roof decking substructures, systems, or assemblies in order to fixedly retain such environmental membranes upon the underlying roof decking substructures, systems, or assemblies so as to permit the environmental membranes to protect the underlying roof decking substructures, systems, or assemblies from environmental or weather conditions. One type of plate is known in the industry as a seam plate or membrane plate which is located at a seam location defined between separate but adjacent or overlapping membrane members. Examples of such seam plates or membrane plates are disclosed within United States Patent **4,945,699** which issued to **Murphy** on August 7, 1990, as well as within United States Patent **4,787,188** which also issued to **Murphy** on November 29, 1988. As can be appreciated from **FIGURE 1** of the drawings, which substantially corresponds to **FIGURE 4** of the aforenoted United States Patent **4,945,699** patent to **Murphy**, a seamed environmental membrane system is disclosed at 110 and is seen to comprise roof decking substructure as disclosed at 103 which may conventionally be provided with overlying insulation 102. The insulation 102 is, in turn,

adapted to have environmental membranes disposed thereon in an overlying manner, and as is conventional, a plurality of the environmental membranes are adapted to be mated together so as to in effect provide the underlying insulation 102 and roof decking substructure 103 with a continuum of protection.

More particularly, for example, at each location or site, along the expanse of the roof decking system or assembly, at which separate and adjacent edge portions of the environmental membranes are to be, in effect, seamed together in an overlapping manner, an edge portion of a first underlying membrane, as disclosed at 101, is adapted to be secured to the underlying deck substructure 103 by means of a seam plate or membrane plate 10, while an edge portion of a second membrane member 104 is adapted to be secured in an overlapping manner with respect to the first underlying membrane member 101 by means of a welded seam 111. The seam plate or membrane plate 10 often has a substantially circular configuration, and is provided with a lower surface portion 12 which is seated atop the first underlying membrane 101, and an upper surface portion 11 over which the second membrane member 104 is disposed. A screw fastener 107 is adapted to pass through an aperture defined within a substantially central portion of the seam plate or membrane plate 10, and accordingly, after the seam plate or membrane plate 10 is disposed atop the first underlying membrane 101, and when the screw fastener 107 is then inserted through the central aperture formed within the seam plate or membrane plate 10 and threadedly engaged within the underlying deck substructure 103, the seam plate or membrane plate 10 will

be secured to the underlying deck substructure 103 so as to in turn fixedly secure the underlying environmental membrane member 101 to the underlying deck substructure 103. After the overlying environmental membrane member 104 is welded to the underlying environmental membrane member 101, as at the seamed location 111, the fixation of the two environmental membranes 101,104 with respect to the underlying deck substructure 103 is complete.

A second type of plate, which is conventionally used in connection with the securing of environmental membranes upon underlying roof decking substructures, systems, or assemblies in order to fixedly retain such environmental membranes upon the underlying roof decking substructures, systems, or assemblies so as to permit the environmental membranes to protect the underlying roof decking substructures, systems, or assemblies from environmental or weather conditions, comprises what is known in the industry as an insulation plate. An insulation plate is similar to the aforenoted seam plate or membrane plate, however, an insulation plate is not necessarily utilized at seam locations defined between adjacent or overlapping edge portions of mated environmental membranes, but, to the contrary, may be utilized at positions intermediate such overlapping edge seam portions of the environmental membranes in order to further ensure the secure fixation of the environmental membranes to the underlying roof decking substructure components. One type of environmental membrane system which is commonly utilized in connection with the covering and protection of underlying roof decking substructure components is known in the art as a fully-adhered-system. As can best

be appreciated from **FIGURE 2**, a conventional or **PRIOR ART** fully-adhered-system for use in conjunction with underlying roof decking substructure components is disclosed and is generally indicated by the reference character 210. More particularly, an underlying roof decking member, which may comprise, for example, corrugated steel decking or non-corrugated wood or concrete decking, is disclosed at 212, and a slab of insulation 214 is adapted to be disposed atop the roof decking member 212.

In addition, a first environmental membrane 216 is adapted to be disposed atop the slab of insulation 214 so as to protect the slab of insulation 214 and the underlying roof decking member 212 from environmental or weather conditions, and in order to fixedly secure the first environmental membrane 216 upon the slab of insulation 214, a plurality of insulation plates, only one of which is disclosed at 218, are disposed atop the first environmental membrane 216. Each one of the insulation plates 218 is fixedly secured to the underlying roof decking member 212 by means of, for example, a suitable threaded fastener 220 which passes through the slab of insulation 214 and is threadedly engaged within the underlying roof decking member 212, and a second environmental membrane 222 is adapted to be disposed atop the first environmental membrane 216 so as to not only cover the first environmental membrane 216, but, in addition, to cover the insulation plate 218 and the head portion of the threaded fastener 220. In this manner, the insulation plate 218 is effectively sandwiched between the first lower environmental membrane 216 and the second upper environmental membrane 222. In accordance with further structural features charact-

eristic of a conventional, **PRIOR ART** fully-adhered environmental membrane system, it is noted that the upper surface portion of the first, lower, underlying environmental membrane 216 has an adhesive coating or layer disposed thereon whereby when the second, upper, overlying environmental membrane 222 is mounted upon the first, lower, underlying environmental membrane 216, the second, upper overlying environmental membrane 222 will be fully adhered to the first, lower, underlying environmental membrane 216.

In conjunction with the foregoing, it is noted that the upper surface portion of the first, lower, underlying environmental membrane 216 is provided with a suitable release sheet, not shown, which, of course, is to be removed prior to the mounting and adherence of the second, upper, overlying membrane 222 atop and upon the first, lower, underlying environmental membrane 216. In order to operatively achieve this structural assembly of the environmental membrane system comprising the first and second environmental membranes 216,222, the first environmental membrane 216 is fixedly secured to the underlying roof decking member 212 by means of the plurality of insulation plates 218 and the threaded fasteners 220 while the release sheet, not shown, is still adhered upon the upper surface portion of the first environmental membrane 216. Subsequently, when it is desired to secure the second overlying environmental membrane 222 atop and upon the first underlying environmental membrane 216, the release sheet, not shown, disposed upon the upper surface portion of the first underlying environmental membrane is removed from the upper surface portion of the underlying environmental membrane 216 so as to effectively

uncover or expose the underlying adhesive coating or adhesive layer disposed upon the upper surface portion of the underlying environmental membrane 216. As may readily be appreciated, however, when it is intended to remove the release sheet, not shown, from the upper surface portion of the underlying environmental membrane 216, such a removal operation is in fact difficult to achieve due to the obvious fact that the release sheet, not shown, is in effect tightly clamped beneath the plurality of insulation plates 218 which are fixedly secured to the underlying roof decking member 212. Accordingly, portions of the release sheet, not shown, disposed around each one of the plurality of insulation plates 218 must be manually ripped or torn away which is not only difficult to achieve, but in addition, such a process results in the irregular removal of the release sheet, such a process may sometimes require the use of special tools in order to remove or separate the release sheet, and such a process is also quite time-consuming.

A need therefore exists in the art for a new and improved insulation plate wherein the insulation plate can not only satisfactorily engage and secure an underlying environmental membrane upon underlying roof decking structural components so as to effectively permit the underlying environmental membrane to resist uplifting wind forces which might otherwise cause the environmental membrane to tear or become dislodged from its position beneath the insulation plate, but in addition, when the insulation plate is being employed in conjunction with a fully-adhered environmental membrane system, the insulation plate will readily facilitate the removal of the release sheet from the upper surface

portion of the first underlying environmental membrane, without causing any tearing of the first underlying environmental membrane to occur, so as to expose the adhesive layer disposed upon the upper surface portion of the first underlying environmental membrane whereupon the second overlying environmental membrane can be secured atop the first underlying environmental membrane so as to effectively form, along with the first underlying environmental membrane, the desired sandwiched environmental membrane system or assembly for protecting the underlying roof decking components from environmental conditions.

SUMMARY OF THE INVENTION

The foregoing and other objectives are achieved in accordance with the teachings and principles of the present invention through the provision of a new and improved insulation plate which comprises a circular structure having a central aperture for permitting a threaded screw fastener to pass therethrough for threaded engagement within the underlying roof decking substructure whereby the insulation plate is fixedly secured to the underlying roof decking substructure. The external periphery of the circular insulation plate is provided with a continuous array of very fine serrated teeth which have predetermined included angle, pitch, and root-to-crest depth dimensions which enable the serrated teeth to effectively engage an underlying environmental membrane, disposed upon underlying roof decking structural components, so as to effectively secure the underlying environ-

mental membrane upon the underlying roof decking structural components without causing any tearing of the underlying environmental membrane, and in addition, the insulation plate will effectively permit the underlying environmental membrane to resist uplifting wind forces which might otherwise cause the environmental membrane to tear or become dislodged from its position beneath the insulation plate.

In addition, when the insulation plate is employed in conjunction with a fully-adhered environmental membrane system, the serrated teeth formed upon the external periphery of the insulation plate will engage the release sheet, disposed upon the upper surface portion of the underlying environmental membrane, so as to initiate and facilitate the controlled, uniform tearing of the release sheet whereby the release sheet can be readily, easily, quickly removed from the upper surface portion of the first underlying environmental membrane, without causing any tearing of the first underlying environmental membrane to occur, so as to expose the adhesive layer disposed upon the upper surface portion of the first underlying environmental membrane whereupon the second overlying environmental membrane can be secured atop the first underlying environmental membrane so as to effectively form, along with the first underlying environmental membrane, the desired sandwiched environmental membrane system or assembly for protecting the underlying roof decking substructural components from environmental conditions. In accordance with a second alternative embodiment of the insulation plate, the serrated teeth are oriented axially downwardly such that when the insulation plate is being fixedly installed upon the underlying roof decking substructures by

means of the threaded screw fastener, an interference fit or keyed fit, defined between the insulation plate and the upper shank portion of the fastener, will cause the insulation plate to rotate with respect to the underlying environmental membrane whereby the axially downwardly oriented teeth can effectively cut through the release sheet or release liner covering the underlying environmental membrane.

BRIEF DESCRIPTION OF THE DRAWINGS

Various other objects, features, and attendant advantages of the present invention will be more fully appreciated from the following detailed description when considered in connection with the accompanying drawings in which like reference characters designate like or corresponding parts throughout the several views, and wherein:

FIGURE 1 is a cross-sectional view of a conventional **PRIOR ART** roof decking system or assembly showing the conventional mounting of a seam plate or membrane plate at the seamed location of two overlapping membrane sheets as secured to the underlying roofing decking substructure;

FIGURE 2 is a cross-sectional view of a conventional **PRIOR ART** fully adhered environmental membrane system wherein a plurality of insulation plates secure a first underlying environmental membrane to underlying roof decking substructural components, and a second overlying environmental membrane is adhesively bonded, by means of an adhes-

ive layer disposed upon an upper surface portion of the first underlying environmental membrane, to the first underlying environmental membrane so as to form therewith a sandwich construction, within which the plurality of insulation plates are encased, whereby the underlying roof decking substructural components are protected from environmental conditions;

FIGURE 3 is a bottom plan view, of a first embodiment of a new and improved insulation plate constructed in accordance with the principles and teachings of the present invention, which particularly illustrates the annular array of radially outwardly projecting serrated teeth formed upon the external periphery of the insulation plate for engaging the release sheet disposed upon the underlying environmental membrane in order to initiate the uniform cutting of the release sheet so as to facilitate the removal of the same from the upper surface portion of the underlying environmental membrane;

FIGURE 4 is a cross-sectional view of the new and improved insulation plate as disclosed within **FIGURE 3** as taken along lines **4-4** of **FIGURE 3**;

FIGURE 5 is a cross-sectional view of the new and improved insulation plate as disclosed within **FIGURE 3** as taken along lines **5-5** of **FIGURE 3**;

FIGURE 6 is a cross-sectional view of the new and improved insulation plate as disclosed within **FIGURE 3** as taken along lines **6-6** of **FIGURE 3**;

FIGURE 7 is an enlarged detail view of a plurality of the serrated teeth disposed upon the external periphery of the new and improved insulation plate as disclosed within **FIGURE 3**; and

FIGURE 8 is a cross-sectional view, similar to that of **FIGURE 4**, showing, however, a second embodiment of a new and improved insulation plate constructed in accordance with the principles and teachings of the present invention, wherein the annular array of serrated teeth, formed upon the external periphery of the insulation plate, are oriented axially downwardly so as to effectively engage the release sheet, disposed upon the underlying environmental membrane, as the insulation plate is installed upon the underlying roof decking substructural components so as to effectively cut the release sheet along a circular locus and thereby facilitate the subsequent removal of the release sheet from the upper surface portion of the underlying environmental membrane.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, and more particularly to **FIGURES 3-6** thereof, a first embodiment of a new and improved insulation plate, constructed in accordance with the principles and teachings of the present invention, is disclosed and is generally indicated by the reference character 310. The insulation plate has a substantially circular configuration, and is in the form of a substantially

flat or planar disc. It is further appreciated that the insulation plate 310 has a diametrical extent D of approximately three inches (3.00"), and is fabricated from an aluminum-zinc alloy coated steel sheet. An aperture 312, having a diametrical extent of approximately 0.25 inches, is formed at the centrally located axial position of the insulation plate 310 so as to accommodate the insertion and passage therethrough of a suitable threaded screw fastener, not shown but similar to the threaded screw fastener 220 as illustrated within **FIGURE 2**, for facilitating the fixation of the insulation plate 310 to underlying roof decking substructural components.

In addition, an axially downwardly recessed region 314, as can best be appreciated from **FIGURE 4**, annularly surrounds the axially central aperture 312 so as to effectively accommodate and seat the head portion of the threaded screw fastener, not shown, whereby the head portion of the threaded screw fastener, not shown, will not project axially above the substantially planar upper surface portion 316 of the insulation plate 310. In this manner, if installation personnel while walking upon the roof decking assembly during the performance of their normal installation work or other operating procedures, should, for example, encounter any one of the insulation plates 310, they can step or tread upon the substantially planar upper surface portion 316 of each insulation plate 310 and will not in fact encounter the head portions of the threaded screw fasteners fixing the particular insulation plate 310 to the underlying roof decking substructure wherein such an encounter with the head portion of the particular threaded screw fastener might oth-

erwise adversely affect the stable fixation of that particular insulation plate 310 upon the underlying roof decking substructure.

With reference continuing to be made to **FIGURES 3-6**, and as can best be appreciated from **FIGURE 4**, it is seen that the substantially planar upper surface portion 316 of the insulation plate 310 is disposed within or defines an upper planar locus UP, while the axially downwardly recessed region 314 is disposed within or defines a lower planar locus LP, and accordingly, the depth or thickness dimension T of the insulation plate 310, as defined between the upper planar and lower planar loci UP,LP, is approximately 0.200 inches. It can be further appreciated that the outer periphery of the insulation plate 310 tapers downwardly from the substantially planar upper surface portion 316 to an annular peripheral flanged or ledge portion 318, and that the annular peripheral flanged or ledge portion 318 is disposed within or defines a planar locus PP which is located slightly above the lower planar locus LP within which the axially downwardly recessed region 314 is disposed. Accordingly, it can be appreciated that when the insulation plate 310 is fixedly mounted and secured upon the underlying roof decking substructure as a result of the threaded screw fastener, not shown, being fully threadedly engaged within the underlying roof decking substructure, the axially downwardly recessed region 314 will become partially embedded within the slab of insulation, similar to the slab of insulation 214 as illustrated within **FIGURE 2**, until the annular peripheral flanged or ledge portion 318 of the insulation plate 310 is effectively seated in a stabilized manner upon the upper surface

portion of the slab of insulation. It is further noted, in connection with the structural makeup or composition of the insulation plate 310, that an annular axially downwardly recessed region 320 is defined within the substantially planar upper surface portion 316 of the insulation plate 310 so as to effectively define an axially downwardly projecting annular rib member 322. As can be seen from **FIGURE 4**, the bottom or lower surface portion of the annular rib member 322 is disposed within or defines a planar locus RP, and it is to be appreciated that the depth dimension of the annular rib member 322 is approximately equal to one-half of the overall depth or thickness dimension T of the insulation plate 310. In addition, a plurality, such as, for example, three, of radially oriented or radially extending rib members 324 integrally interconnect the annular rib member 322 to the annular ledge or flanged portion 318 as can best be appreciated from **FIGURES 3,5,** and **6**. While the particular number of radially oriented or radially extending rib members 324 can vary, it is to be noted, as can best be appreciated from **FIGURE 3**, that regardless of the particular number of radially oriented or radially extending rib members 324 that are utilized, such rib members 324 are to be equally spaced from each other in a circumferential array. Accordingly, as illustrated, the three radially oriented or radially extending rib members 324 are angularly spaced from each other through means of arcuate extents comprising 120°.

With reference now being made to **FIGURES 3** and **7**, and in accordance with the particularly unique and novel feature characteristic of the present invention, the outer peripheral edge portion of the insulation plate 310 has a

continuous circumferential array of serrated teeth 326 which are formed thereon so as to project radially outwardly. Each one of the serrated teeth 326 has a depth dimension TD, as measured between the root and crest portions of the tooth, of approximately 0.030 inches, and the pitch TP, as defined between successive crest portions of adjacent or successive teeth 326, is approximately 0.046 inches. In addition, it is noted that each one of the teeth 326 has an isosceles triangle configuration with the radially outwardly projecting apex portion of the triangle having an included angle A defined between the equal sides of the triangle as comprising approximately 60°. Accordingly, reverting back to the typical or conventional fully-adhered environmental membrane system as illustrated within **FIGURE 2**, as has been noted hereinbefore, the upper surface portion of the first, lower, underlying environmental membrane 216 has a release sheet or release liner, not shown, disposed thereover which is adapted to be removed, after the first, lower, underlying environmental membrane 216 has been secured to the underlying insulation and roof decking members 214,212 by means of the insulation plate and threaded screw fastener components 218, 220, when it is desired to install the second, upper, overlying environmental membrane 222 atop the first, lower, underlying environmental membrane 216. As is also known and conventional, the release sheet or release liner, not shown, is conventionally fabricated from a suitable thermoplastic material and typically has a thickness dimension of approximately one mil or 0.001 inches.

Accordingly, when the new and improved insulation plate 310 of the present invention is utilized within a

fully-adhered roof decking system, similar to that illustrated within **FIGURE 2**, and wherein the new and improved insulation 310 of the present invention effectively replaces the illustrated insulation plate 218, then when it is desired to remove the release sheet or release liner, not shown, from the upper surface portion of the first, lower, underlying environmental membrane 216, installation personnel can, for example, begin to peel the release sheet or release liner away from the upper surface portion of the first, lower, underlying environmental membrane 216 and upon encountering each one of the new and improved insulation plates 310, that portion of the release sheet or release liner which is disposed immediately adjacent to the outer peripheral edge portion of the insulation plate 310 will be forced into contact with the plurality of serrated teeth 326 formed thereon. Accordingly, as a result of such engaged contact between the release sheet or release liner, and the plurality of serrated teeth 326 of the insulation plate 326, the serrated teeth 326 will readily and easily cause a controlled and well-defined tearing or ripping of the release sheet or release liner along a circular locus defined by means of the external periphery of the insulation plate 326.

This interaction defined between the serrated teeth 326 and the release sheet or release liner thereby facilitates the overall installation operation by installation personnel and effectively eliminates the irregular tearing or ripping of the release sheet or release liner, with damage also possibly being inflicted upon the underlying environmental membrane 216, as well as rendering the installation operation faster and more cost-effective. Still yet

further, it is to be appreciated that after the release liner or release sheet has been severed and removed, or when the new and improved insulation plate 310 of the present invention is not employed within a fully-adhered environmental membrane system similar to that disclosed at 210 within **FIGURE 2**, but to the contrary, is employed within, for example, a seamed environmental membrane system similar to that disclosed at 110 within **FIGURE 1**, the external peripheral array of serrated teeth 326 will be beneficial when engaging portions of the environmental membranes which may come into contact with the array of serrated teeth 326 in that the serrated teeth 326 can effectively engage and positively hold or retain the environmental membranes so as to actively resist, for example, the destructive actions normally caused by uplifting wind forces. In conjunction with such engaging and retaining functions, it is noted that, unlike the case or instance in which the array of serrated teeth 326 caused a controlled, defined tearing or ripping of the release liner or release sheet when the release sheet or release liner was forced into engagement with the array of serrated teeth 326, such tearing or ripping actions will not occur when the environmental membranes are forced into contact with the array of serrated teeth 326 under the aforenoted uplifting wind forces due to the fact that the thickness dimensions of the environmental membranes are significantly greater than the thickness dimension of the release sheet or release liner. In particular, conventional environmental membranes have thickness dimensions of approximately 0.070 inches.

With reference lastly being made to **FIGURE 8**, a second embodiment of a new and improved insulation plate,

likewise constructed in accordance with the principles and teachings of the present invention, is disclosed and is generally indicated by the reference character 410. As can be readily appreciated, **FIGURE 8** comprises a cross-sectional view of the second embodiment of the new and improved insulation plate 410 of the present invention which is similar to **FIGURE 4**, which is a cross-sectional view of the first embodiment of the new and improved insulation plate 310 of the present invention, and therefore, for brevity purposes, the detailed description of the second embodiment of the new and improved insulation plate 410 as disclosed within **FIGURE 8** will be confined to the differences between the first and second embodiments of the insulation plates 310,410. In addition, it is noted that structural components of the second embodiment insulation plate 410, which correspond to those structural components of the first insulation plate 310, will be designated by similar reference characters except that the reference characters will be within the 400 series. More particularly, it is noted that the only significant difference between the insulation plates 310,410 resides in the fact that, in accordance with the second embodiment insulation plate 410, the continuous circumferential array of serrated teeth 426, in lieu of being oriented radially outwardly, are oriented axially downwardly.

In addition, the depth dimension TD of each tooth 426, as measured or defined between the root and crest portions of each tooth, is smaller than the depth dimension TD of each tooth 326 and is approximately 0.015 inches. Accordingly, the included angle A defined by each tooth, as well as the pitch TP defined between adjacent or successive ones

of the teeth, may be slightly different from the corresponding parameters characteristic of teeth 326. In view of the fact that the serrated teeth 426 are oriented axially downwardly, the circumferential array of serrated teeth 426 are adapted to effectively cut through or sever the release layer or release sheet as disposed atop the first, lower underlying environmental membrane 216 without, of course, significantly severing the underlying environmental membrane 216. In order to in fact achieve such a cutting or severing operation, the insulation plate 410 is adapted to be rotated around its central axis 428 whereby as the insulation plate 410 is rotated, the circumferential array of serrated teeth 426 will cut or sever the release liner or release sheet disposed atop the underlying environmental membrane 216. Accordingly, in order to achieve such rotation of the insulation plate 410 with respect to the underlying environmental membrane 216, and the release sheet or release liner disposed thereon, the diametrical extent of the central aperture 412 is predeterminedly dimensioned so as to effectively define, in effect, a substantial friction or interference fit with, for example, the upper shank portion of the threaded screw fastener 220.

In this manner, as the threaded screw fastener 220 is threadedly engaged within the underlying roof decking member 212, and approaches the position at which the threaded screw fastener 220 will be fully inserted and seated within the underlying roof decking member 212, the upper shank portion of the fastener 220, defining the aforenoted friction or interference fit with the central aperture 412 of the insulation plate 410, will cause the insulation plate

410 to rotate around its axis 428 such that the axially downwardly oriented serrated teeth 426 can effectively cut and sever the release sheet or release liner disposed atop the first underlying environmental membrane 216. Accordingly, once the release sheet or release liner is completely cut or severed by means of the serrated teeth 426, that portion of the release sheet or release liner disposed around the particular insulation plate 410 can be removed so as to uncover the underlying adhesive upon which the second upper environmental membrane 222 can then be adhered.

It is noted further that in lieu of providing the aforenoted friction fit or interference fit between the upper shank portion of the threaded screw fastener 220 and the central aperture 412 defined within the insulation plate in order to achieve the aforenoted rotation of the insulation plate 410 with respect to the underlying membrane 216 and the release sheet or release liner disposed thereon whereby the cutting or severing of the release sheet or release liner can be achieved, an alternative means for causing such rotation of the insulation plate 410, with respect to the underlying membrane 216 and the release sheet or release liner disposed thereon, in order to likewise achieve the cutting or severing of the release sheet or release liner, could comprise a keyed structural arrangement defined, for example, between the upper shank portion of a threaded screw fastener similar to the threaded screw fastener 220 and the central aperture 412 formed within the insulation plate 410. For example, the central aperture 412, in lieu of having a circular configuration, could have a substantially square-shaped or other geometrical configuration, and the upper

shank portion of the threaded screw fastener would have a corresponding geometrical configuration so as to effectively define a rotary drive with the aperture 412 when the upper shank portion of the threaded screw fastener operatively engages the central aperture 421 defined within the insulation plate 410.

It is lastly noted, as was the case with the first embodiment of the insulation plate 310 of the present invention, as illustrated, for example, within **FIGURES 3** and **4**, that after the release sheet or release liner has been severed and removed, the external peripheral array of serrated teeth 426 will be beneficial in that the serrated teeth 326 will already be effectively engaged with the underlying environmental membranes and can therefore positively hold or retain the underlying environmental membranes so as to actively resist, for example, the destructive actions normally caused by uplifting wind forces. Still further, the new and improved second embodiment insulation plate 410 of the present invention need not only be employed within a fully-adhered environmental membrane system similar to that disclosed at 210 within **FIGURE 2**, but to the contrary, can be employed within, for example, a seamed environmental membrane system similar to that disclosed at 110 in **FIGURE 1**, wherein, again, the external peripheral array of serrated teeth 426 can be beneficial by effectively and positively holding or retaining the underlying environmental membranes so as to actively resist the destructive actions normally caused by uplifting wind forces. When the second embodiment insulation plate 410 is employed within a seamed environmental membrane system, the insulation plate 410 may be structured relative

to the threaded screw fastener so as not to undergo any rotation therewith but, to the contrary, will simply be engaged with the underlying environmental membranes when the insulation plate 410 is fully installed upon the underlying roof decking substructure such that the serrated teeth 426 thereof are only partially embedded within the uppermost regions or layers of the underlying environmental membranes. More particularly, in conjunction with its engaging and retaining functions, and as was also the case with the first embodiment insulation plate 310, it is noted that, in view of the fact that the thickness dimension of each one of the environmental membranes is significantly greater than the depth dimension of the serrated teeth 426, the serrated teeth 426 do not pose any significant threat of undesirably cutting or severing the underlying environmental membranes even under uplifting wind force conditions.

Thus, it may be seen that in accordance with the principles and teachings of the present invention, a new and improved insulation plate or seam plate has been developed wherein, in accordance with a first embodiment of the insulation plate, the external peripheral edge portion of the insulation plate is provided with a continuous circumferential array of radially outwardly projecting serrated teeth which are adapted to engage a release sheet or release liner, disposed upon an underlying environmental membrane of a fully-adhered environmental membrane system covering roof decking substructural components, as the release sheet or release liner is effectively moved into engagement with the serrated teeth. In this manner, the release sheet or release liner is readily and easily cut or severed along a well-de-

fined locus such that the release sheet or release liner can be removed and thereby uncover the adhesive layer disposed upon the upper surface portion of the underlying environmental membrane in preparation for securing an overlying environmental membrane atop the underlying environmental membrane in order to form the fully-adhered environmental membrane system. Alternatively, the continuum of serrated teeth may be oriented axially downwardly so as to cut or sever the release sheet or release liner as the insulation plate is effectively rotated along with the threaded screw fastener as the latter is threadedly engaged within the underlying roof decking substructure. In addition, both the radially outwardly and axially downwardly oriented serrated teeth also serve to fixedly and assuredly retain the underlying membrane upon the underlying roof decking substructure in order to positively or effectively resist uplifting wind forces.

Obviously, many variations and modifications of the present invention are possible in light of the above teachings. For example, while the insulation or seam plate has been illustrated as having a substantially circular configuration, other geometrical configurations, such as, for example, triangular, square, oval, rectangular, star-shaped, polygonal, irregular, and the like, are of course possible, the corner regions also of course being rounded where necessary so as not to present any sharp-cornered areas to the underlying membrane. It is therefore to be understood that within the scope of the attached or appended claims, the present invention may be practiced otherwise than as specifically described herein.